

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/19/10 has been entered. Claims 12-15, 17-30, 33 are currently under examination on the merits.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 23, 28 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 23 and 28 are dependent on cancelled claim 1 and therefore it is unclear which claim they are meant to be dependent on.

5. Claim 33 recites a sputtering target "for obtaining a layer" which is vague and indefinite in that it is unclear if the target is meant to be capable of being used to create the layers mentioned in the claims (i.e. intended use) or if the other layers are also being claimed.

Examiner's Note

6. The examiner notes that in claims 30 and 33 lines 2 and 3 recite "comprises comprising."

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7. The examiner also notes that a different Wolfe references is used in this rejection than in the previous rejection.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 12, 13, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolfe et al. (U.S. 5,377,045).

Regarding claim 12, Wolfe discloses a transparent substrate with a functional layer of silver which has infrared functionality (See Abstract) with SiZrN composites on either side of the functional layer (8 and 16, Fig. 1A). The outer layer, 16, is disclosed as being formed from SiZrN with the ratio of Si/Zr being between 4 and 4.88 times as much as the zirconium and with the refractive index up to 2.2 (C4, L10-40). These values fall within the claimed range.

Regarding claim 13, Wolf discloses one functional layer and two dielectric layers (Fig. 1A). Regarding claim 28, the substrate is capable of undergoing heat treatment.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 14, 15, 17-22, 25-27, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfe et al. (U.S. 5,377,045) as applied to claim 12 above, and further in view of Nadaud et al. (WO 03/010105), see English language equivalent U.S. 2004/0241406).

Regarding claims 14, 15, 17-19, Wolfe et al. discloses all of the claimed limitations as set forth above. Additionally, Wolfe et al. discloses that Silicone Zirconium nitride is a preferred high refractive index material (C2, L60-C3, L30). Wolfe et al. does not explicitly disclose the specific layering arrangements. Nadaud discloses that infrared functional films like in Wolfe can be made with multiple sandwiched layers of functional material including 2 and 3 sandwiches of functional material (See Abstract, [0023] and [0035]-[0040]). With respect to claims 17 and 18,

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the first and last high-index dielectric layer have a thickness in the range of instant claims 17 and 18 (See [0040] and Table 1, 22.5 and 26 nm respectively). The high refractive index layer in between the two functional layers is disclosed as having a thickness falling within the range of instant claim 18 (See [0040] and Table 1, 62 nm). With respect to claim 19, Nadaud discloses that the silicon nitride layers (being replaced with SiZrN as per Wolfe) in between two functional layers of silver should have a thickness of at least 50 nm ([0040]). It would have been obvious to have used the SiZrN of Wolfe instead of the SiN called for in Nadaud because of the disclosed beneficial properties mentioned in Wolfe (C2, L60-C3, L30).

Regarding claims 20 and 21, Wolfe discloses that on either side of the silver functional layer, including the side closer to the substrate, is a layer of visible metal with a thickness of at least 1 nm (C3, L45-C4, L10). Regarding claim 22, using multiple sandwiches of functional layers, the lower SiZrN layers are covered with subsequent oxide and nitride layers (Nadaud, [0037]). With respect to claims 25-27, see Example 7, [0058], substoichiometric amounts of zinc oxide are disclosed as being placed both above and below the functional layer. With respect to claim 29, see [0037], the two types of stacks (having both one and two functional layers) read on the limitations of instant claim 29 (replacing the silicon nitride of Nadaud et al. with the Silicon Zirconium Nitride of modified Wolfe et al.).

Regarding claim 30, the glazing of Nadaud, having the SiZrN layer of Wolfe with its refractive index and ratio of Si to Zr as explained in the rejection of claim 12, is a multiple glazing in that it has multiple sandwiched functional glazing layers. With the multiple sandwiched layers ([0039]) there are alternating high and low refractive index layers with the

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SiZrN from Wolfe being a high refractive index layer with a refractive index within both of the claimed ranges (see rejection of claim 12).

14. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfe et al. (U.S. 5,377,045) as applied to claim 12 above, and further in view of Kimock et al. (U.S. 5,268,217).

Regarding claims 23 and 24, Wolfe et al. discloses all of the claimed limitations as set forth above. Wolfe et al. does not disclose that the transparent substrate includes a DLC-based overcoat between 5 and 10 nm thick.

Kimock et al. discloses a transparent substrate with a DLC-based overcoat between 5 and 10 nm thick.

(See C7, L55-65, 50 angstroms, or 5 nm, and (C13, L55-C14, L1), 100 angstrom, or 10 nm, thick diamond like carbon layers are disclosed as being created on the outer surfaces of substrate which have first been magnetron sputtered with, inter alia, silicon nitrides and zirconium nitrides (C5, L25-45) in order to improve abrasion resistance.)

The inventions of both Wolfe et al. and Kimock et al. are drawn to the field of coated laminates with high and low refractive index layers and therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the transparent substrate of modified Wolfe et al. by adding the DLC coating as taught by Kimock et al. for the purposes of imparting improved abrasion resistance.

15. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable Wolfe et al. (U.S. 5,377,045) as applied to claim 12 above, and further in view of Nadaud et al. (WO 03/010105),

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see English language equivalent U.S. 2004/0241406), as applied to claims 12 and 30 above, and further in view of Kida et (U.S. 5,354,446).

Regarding claim 33, modified Wolfe et al. discloses all of the limitations as set forth above. Additionally, Wolfe et al. discloses that Aluminum can be used to dope silicon during sputtering (C6, L40-55). Modified Wolfe also discloses the layer limitations of claim 33, (see rejection of claim 12 and 30 above). The glazing of Nadaud, having the SiZrN layer of Wolfe with its refractive index and ratio of Si to Zr as explained in the rejection of claim 12, is a multiple glazing in that it has multiple sandwiched functional glazing layers. With the multiple sandwiched layers ([0039]) there are alternating high and low refractive index layers with the SiZrN from Wolfe being a high refractive index layer with a refractive index within both of the claimed ranges (see rejection of claim 12).

Modified Wolfe et al. does not disclose a magnetron sputtering target which would have a difference between the target and the layer.

Kida et al. discloses a plane or tubular, magnetron sputtering target for obtaining at least one layer comprising silicone, zirconium and aluminum,.

(See C4, L40-57, a magnetron sputtering target is disclosed which is created via hot isostatic pressing and cold isostatic pressing (C8, L5-C10, L25), with the target including Si, Zr (Table 2, Example 15, C21-C22) and Al (C6, L12-20). Using the targets of Kida et al. to form the antireflective layered structure of modified Wolfe et al. would inherently have a degree of difference between the ratio of Si/Zr in the target as compared to the ratio in the layer. The target of Kida is disclosed as having Si/Zr ratios

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of 96:4 -65:35. (C5, L30-55). The target of Kida et al. is advantageous in that it does not exhibit peeling (C3, L60-C4, L10).)

The inventions of both modified Wolfe et al. and Kida et al. are drawn to the field of mixed silicon zirconium coatings and therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the targets of modified Wolfe et al. by using the hot pressed target of Kida et al. for the purposes of imparting improved peel resistance and still allowing the Si/Zr ratio to be controlled.

Response to Arguments

16. Applicant's arguments are considered moot in light of the new grounds of rejection.

Arguments which are still deemed valid are addressed below.

17. Applicant argues that it would not be obvious to optimize the relative amount of Si/Zr.

While this point is moot since the current Wolfe reference explicitly discloses Si/Zr ratios and refractive indexes within the claimed range, the examiner still maintains that in general altering the ratios to control the refractive index would have been obvious.

18. Applicant again argues that the examples show that SiZrN is advantageous over SiN.

This may be so but it is not relevant to arguing the unexpected results for a specific ratio of Si/Zr. Also the prior art already discloses many benefits of SiZrN to SiN (See Wolfe).

19. Turning to applicant's disclosure, first the examiner notes that the old Wolfe reference is no longer the closest prior art and if applicant wished to show unexpected results the new Wolfe reference should be compared against (i.e. with its refractive index of 2.2 and its ratio of 4.88). Also, the amount of data given comparing the previous Wolfe reference was inadequate for a showing of unexpected results because only one value within the claimed range was used to

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support the showing. At the very least, the upper endpoint ($\text{Si/Zr} = 5$) would also have to be compared. The examiner also notes that the previously submitted declaration compares a value of Si/Zr which is outside of the claimed range (i.e. 4.5) and is therefore not relevant at all to unexpected results.

20. Applicant argues that Wolfe's concern with intrinsic stress would make the claimed range unexpected; however the current Wolfe reference discloses that values within the claimed range were acceptable for intrinsic stress considerations and applicant has provided no showing of what Wolfe considers a bad level of intrinsic stress nor any showing of what the intrinsic stress is for the claimed range of Si/Zr which makes it unexpectedly low.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL B. NELSON whose telephone number is (571) 270-3877. The examiner can normally be reached on Monday through Friday 6AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MN/

11/03/10

/Angela Ortiz/

Supervisory Patent Examiner, Art Unit 1798